

REMARKS

I. Status of the Claims

Claims 1, 3-8, 18, 26-32, 35, 72-73, and 75-89 are now pending in this application. Claims 36-71 and 90-121 were cancelled previously and claims 2, 9-17, 19-25, 33-34, and 74 are canceled herein without prejudice or disclaimer. Claim 1 is amended herein to recite that the at least one first block has a Tg of greater than or equal to 40°C and is present in an amount ranging from 50% to 90% by weight relative to the total weight of the block polymer; and the at least one second block has a Tg of less than or equal to 20°C and is present in an amount ranging from 5% to 45% by weight relative to the total weight of the block polymer. Support for this amendment may be found throughout the specification and original claims, for example, claims 2, 16, 24, 25, 33, and 34, and at ¶¶ [062]-[066], [068]-[069], [086]-[087], [0149], and [0152] of the specification as originally filed. Claims 18, 26-28, 35, and 75 are also amended herein to correct their dependency. As such, Applicants submit that no new matter has been added by these amendments.

This Amendment was previously submitted on July 31, 2007, however, it was not entered by the Examiner. See Advisory Action. In view of the RCE filed concurrently herewith, Applicants ask that the Examiner enter these Amendments and Remarks. In addition, Applicants respectfully disagree with the Advisory Action, as set forth in a separate section below.

II. Rejections Under 35 U.S.C. § 103(a)

The Examiner maintains the rejection of claims 1-35 and 72-89 under 35 U.S.C. § 103(a) as allegedly unpatentable over U.S. Patent No. 6,410,005 to Galleguillos et al. ("Galleguillos"), or U.S. Patent No. 6,663,855 to Frechet et al. ("Frechet '855"), or

U.S. Patent No. 6,685,925 to Frechet et al. ("Frechet '925"), or U.S. Patent No. 6,197,883 to Schimmel et al. ("Schimmel"), or U.S. Patent No. 6,153,206 to Anton et al. ("Anton"). See Final Office Action at 2. Applicants respectfully traverse these rejections for the reasons of record and for at least the following reasons discussed in more detail below.

Several basic factual inquiries must be made in order to determine the obviousness or non-obviousness of claims of a patent application under 35 U.S.C. § 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

- (1) Determine the scope and content of the prior art;
- (2) Ascertain the differences between the prior art and the claims in issue;
- (3) Resolve the level of ordinary skill in the pertinent art; and
- (4) Evaluate evidence of secondary considerations.

The obviousness or nonobviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. 467.

Thus, in order to carry the initial burden of establishing a *prima facie* case of obviousness that satisfies the *Graham* standard, the Examiner must at least show (1) that the prior art reference teaches or suggests all the claim limitations, (2) that there is some suggestion or motivation, either in the reference or in the knowledge generally available to one of ordinary skill in the art, to modify the reference, and (3) that there is some reasonable expectation of success. See M.P.E.P. § 2143. The Supreme Court, in its recent decision in *KSR Int'l Co. v. Teleflex, Inc.*, recognized that a showing of "teaching, suggestion, or motivation" could provide helpful insight in determining

whether the claimed subject matter is obvious under § 103(a). *KSR*, 127 S. Ct. 1727, 1740-41, 82 U.S.P.Q.2d 1385, 1396 (2007).

Here, the references do not teach or suggest a triblock polymer as claimed, comprising an intermediate block comprising at least one constituent monomer of the at least one first block and at least one constituent monomer of the at least one second block. That is, the present claims relate to a triblock polymer A-B-C, wherein the intermediate block B comprises at least one monomer of the first block A, and at least one monomer of the second block, C.

Further, the references do not disclose or suggest a block polymer as claimed with a polydispersity index of greater than 2.

Moreover, in order to expedite prosecution, but without acquiescing to the Examiner's rejection, Applicants have amended claim 1 to recite that the at least one first block has a Tg of greater than or equal to 40°C and is present in an amount ranging from 50% to 90% by weight relative to the total weight of the block polymer; and the at least one second block has a Tg of less than or equal to 20°C and is present in an amount ranging from 5% to 45% by weight relative to the total weight of the block polymer. The references further do not teach or suggest a block polymer in the claims as amended containing more of the first block with a higher Tg than the second block with a lower Tg.

Each of the cited references is discussed in more detail below.

Galleguillos

In the Final Office Action, the Examiner again asserts that "[a]bsent of specific compositional and architectural details defined for the instant intermediate block, prior art -B-X-X-A- linkages in structures 1 and 2 fall within the scope of the instant

intermediate block defined in the present claims.” Final Office Action at 3. The Examiner also states that “[t]he linkage of X-X reads on the instant intermediate block, wherein X is also a constituent monomer of the A and B blocks.” *Id.* at 8. Applicants respectfully disagree.

For the sake of brevity, Applicants do not repeat the arguments of their last response regarding Galleguillos in full, but incorporate them by reference. In short, however, Galleguillos does not teach or suggest a third/intermediate block as the Examiner incorrectly asserts. See Galleguillos, col. 4, lines 20-24; col. 5, lines 21-22. Moreover, Galleguillos does not specify number average or weight average molecular weight for the block copolymer, so the polydispersity index cannot be determined, despite the fact that Galleguillos mentions the molecular weight for the block copolymer. See, e.g., *id.* at col. 5, lines 23-29. The Examiner has not disputed the last point.

Furthermore, as noted above, claim 1 has been amended to recite that the at least one first block has a Tg of greater than or equal to 40°C and is present in an amount ranging from 50% to 90% by weight relative to the total weight of the block polymer; and the at least one second block has a Tg of less than or equal to 20°C and is present in an amount ranging from 5% to 45% by weight relative to the total weight of the block polymer. Therefore, the block polymer must contain more of the first block with a Tg greater than or equal to 40°C than the second block with a Tg less than or equal to 20°C.

The Examiner asserts that the Tg of the preferred species of the monomer A disclosed in Galleguillos “read on the instant low Tg,” and the monomer B has a Tg, which “clearly fall within the scope of the instant block having Tg greater than or equal to 40°C.” Final Office Action at 3-4. While Galleguillos discloses an A-block with a “low

Tg” and a B-block with a “high Tg” (Galleguillos, col. 5, lines 62-64), Galleguillos does not teach using more of the high Tg block than the low Tg block. In fact, Galleguillos teaches that it is possible that the copolymer contains more of the A-block than the B-block (*see id.* at col. 13, lines 1-8 (disclosing an embodiment comprising 28-60% by weight of monomer A and 38-69% by weight of monomer B)), which is in stark contrast to the presently amended claims.

Accordingly, the Examiner has not established a *prima facie* showing of obviousness with respect to the presently amended claims and Applicants respectfully request that this rejection be withdrawn.

Frechet '855 and '925

In the Final Office Action, the Examiner again contends that Frechet teaches “Mn and Mw of the respective core and flanking polymers within the claimed range. A molar ratio of the core polymer to the flanking polymer from 1:10 to 10:1 is further suggested.” Final Office Action at 5 (citing Frechet at col. 5, lines 1-15). Applicants respectfully disagree.

For the sake of brevity, Applicants do not repeat the arguments of their last response regarding the Frechet references in full, but incorporate them by reference. In short, however, the Frechet references, either alone or in combination, do not teach or suggest each and every element of the claims. Specifically, the Examiner appeared to mistakenly equate the recited Mw and Mn values for the core and flanking polymers with the Mw and Mn values for the entire block polymer of the present disclosure. According to the present claims, “the block polymer has a polydispersity index I of greater than 2.” *See, e.g.*, claim 1 (emphasis added). Further, according to the present disclosure, the polydispersity index is “equal to the ratio of the weight-average mass Mw

to the number-average mass M_c ” of the entire polymer. See Specification as-filed at ¶ [0047]. Thus, both of the Examiner’s positions are incorrect and neither of the Frechet references provides any guidance to the skilled artisan to arrive at a block polymer having a polydispersity index of greater than 2 as presently claimed. The Examiner has not disputed this point. Because the Frechet references fail to teach or suggest each and every limitation of the present amended claims, Applicants respectfully submit that this rejection should be withdrawn for at least this reason.

In addition, like Galleguillos, the Frechet references would not provide a reason for one skilled in the art to use more of a polymer with the higher Tg than a polymer with the lower Tg. The Examiner notes that component A of Frechet “is a hard block having a high Tg (i.e. preferably from 30 to 150°C), and component B is a soft block having a low Tg (i.e. preferably from 175 [sic, -75] to less than 30°C).” Final Office Action at 4 (citing Frechet at col. 3, lines 66 – col. 4, line 36). Frechet, however, teaches that it is not only possible, but preferable, that the polymer contains more of component B with the low Tg than component A with the high Tg. See Frechet at col. 5, lines 12-15 (“Preferably, the molar ratio of the core polymer [low Tg] to the flanking polymers [high Tg] is from 3:1 to 10:1.”) (emphasis added). Frechet, therefore, teaches away from the presently amended claims, which require that the block polymer contain more of the first block with a higher Tg than the second block with a lower Tg. Because one skilled in the art would not have been motivated to use more of component A with the higher Tg than component B with the lower Tg, Applicants submit that the rejection is improper and should be withdrawn.

Schimmel

In the Final Office Action, the Examiner again asserts that “Example A is a triblock polymer “which meets the requirement of the present block copolymer as defined in the present claims.” Final Office Action at 6. Applicants respectfully disagree.

For the sake of brevity, Applicants do not repeat the arguments of their last response regarding Schimmel in full, but incorporate them by reference. In short, however, the Examiner did not respond to Applicants’ argument that Schimmel teaches narrow molecular weight distributions and low polydispersity indices (i.e., less than 2), thereby teaching away from the block polymer of the presently pending claims. While Schimmel states that the polymer product by ATRP provides polymers with “narrow molecular weight distributions, e.g., polydispersity index values (PDI) less than 2.5” (see Schimmel at col. 8, line 59 – col. 9, line 3), the triblock polymer of Example A has a polydispersity index of 1.8 (see *id.* at col. 24, lines 47-49) and all of the polymers described in Examples A-D have polydispersity indices of less than 2. Only the polymer of Example E, a comparative example, has a polydispersity index of greater than 2. Thus, Schimmel actually teaches low polydispersity indices (i.e., less than 2), thereby teaching away from the block polymer of the presently pending claims. As such, Schimmel cannot serve as a proper basis for an obviousness rejection and Applicants respectfully request that this rejection be withdrawn.

In addition, Schimmel discloses a block copolymer comprising a first block and a second block, wherein the monomers of the second block have a T_g of at least 20°C greater than that of the monomers of the first block. See Schimmel, Abstract. Schimmel, however, teaches that “[t]he weight ratio of the first block to the second block of the polymeric flow control agent of the present invention is typically from 0.05:1 to

19:1, e.g., from 0.1:1 to 9:1 or from 0.2:1 to 6:1.” *Id.* at col. 4, lines 22-25. Thus, one skilled in the art would not have been motivated to use more of the second block with a higher T_g than the first block with a lower T_g, as required by the presently amended claims. Applicants respectfully submit, therefore, that the rejection should be withdrawn for at least this reason as well.

Anton

In the Final Office Action, the Examiner again argues that Anton’s “block copolymer and random copolymer architectural representatives shown at col. 4, lines 28-60, embrace the instant block polymer as defined in the present claims.” Final Office Action at 7. The Examiner further contends that column 4 of Anton “teaches possible architecture of block and random block polymer containing blocks of first and second repeating units with random blocks containing first and second repeating units dispersed between the respective blocks,” which “encompass[] the presently claimed block polymer.” *Id.* at 7-8. Applicants respectfully disagree.

For the sake of brevity, Applicants do not repeat the arguments of their last response regarding Anton in full, but incorporate them by reference. In short, however, Anton, at best, discloses a diblock polymer. Anton nowhere mentions or suggests a third block or an intermediate block, much less an intermediate block comprising at least one constituent monomer of the first and second blocks as presently claimed. Moreover, the Examiner did not respond to Applicants’ argument that Anton nowhere defines the polydispersity index or number average or weight average molecular weight of the polymer. Thus, Anton is completely silent with respect to at least two elements of the presently pending claims. As such, Anton cannot and does not provide guidance to the skilled artisan to modify the polymer of Anton to arrive at the presently claimed block

polymer. Accordingly, the Examiner has not established a *prima facie* showing of obviousness with respect to the pending claims and Applicants respectfully request that this rejection be withdrawn.

Furthermore, as the Examiner notes (*see* Final Office Action at 6), Anton discloses a polymer comprising a first repeat unit having a Tg of -10 to 75°C and a second repeat unit having a Tg of 76 to 120°C. *See* Anton, Abstract; col. 4, lines 62 – col. 5, line 1. Anton, however, also teaches that the weight ratio of two repeat units can vary from 2-99% by weight of the first repeat unit to 1-98% by weight of the second repeat unit, **and vice versa**. *Id.* at col. 5, lines 3-18. Anton also states that the polymer preferably contains 50% by weight of the first repeat unit and 50% by weight of the second repeat unit. *Id.* at col. 5, lines 23-25. Clearly, one skilled in the art would not have been motivated to use more of the second repeat unit with the higher Tg than the first repeat unit with the lower Tg, as required by the presently amended claims. Thus, Applicants respectfully submit that the Examiner has not and cannot establish a *prima facie* case of obviousness for this reason and request that the rejection be withdrawn.

Advisory Action

In the Advisory Action dated August 6, 2007, the Examiner contends that the prior art suggests a greater proportion of the first block relative to the second block. *See* Advisory Action at 2. The Examiner argues that (1) Galleguillos “discloses a preferred molecular weight of 10,000-50,000 A, and 1,000 and 50,000 B, which clearly overlaps with the recited proportions;” (2) Frechet '925 “discloses molar ratio of the core polymer (e.g. soft block) to the flanking polymer (e.g. hard block) from 1:10 to 10:1 which clearly [sic] encompass applicant’s proportions;” and (3) Schimmel “discloses a weight ratio of the first block (e.g. soft block) to the second block (e.g. hard block) from

0.05:1 to 19:1 [which] clearly encompass the recited range.” Advisory Action at 2. The Examiner did not address Anton in the Advisory Action, but presumably the Examiner still maintains the rejection based on that reference for the reasons of record.

The Examiner argues that the proposed claimed ratio of first and second blocks does not impart patentability without evidence of unexpected results. *See* Advisory Action at 2. The Examiner asserts that the present specification “teaches a block copolymer formed by a first and second blocks [sic] present in the polymer mixture in a ratio ranging from 10/90 to 90/10 by weight (page 2, [011]).” *Id.* Moreover, the Examiner dismisses Applicants’ argument that the prior art teaches away from the claimed ratio, arguing that one skilled in the art would have expected the same or similar properties because the prior art and claimed ranges overlap. *Id.*

Applicants respectfully disagree with the Examiner. The Examiner’s conclusion demonstrates that she is still ignoring part of the test for obviousness, e.g., all claim limitation must be taught. *See* M.P.E.P. § 2143. In particular, the Examiner has still not established that the cited references teach or suggest (1) a tri-block polymer, and (2) a tri-block polymer as claimed with a polydispersity index of greater than 2. Indeed, the Advisory Action says nothing about these points.

Moreover, the Examiner ignores the fact that the references teach away from a block polymer in the claims as amended containing more of the first block with a T_g greater than or equal to 40°C than the second block with a T_g less than or equal to 20°C. *See* M.P.E.P. § 2141.02(VI) (“A prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.”) (citation omitted, emphasis in original). For example, Frechet states that it is **preferable** that the disclosed polymer contain more of the soft block having a low T_g than the hard

block having a high Tg. See Frechet at col. 5, lines 12-15 ("**Preferably**, the molar ratio of the core polymer [low Tg] to the flanking polymers [high Tg] is from 3:1 to 10:1.") (emphasis added). Frechet, therefore, teaches away from a block polymer in the claims as amended containing more of the first block with a higher Tg than the second block with a lower Tg. Accordingly, Applicants respectfully submit that the Examiner's position in the Advisory Action is incorrect and the rejection should be withdrawn for this reason as well.

CONCLUSION

In view of the foregoing amendments and remarks, Applicants submit that the claimed invention is neither anticipated nor rendered obvious in view of the prior art references cited against this application.

If the Examiner believes a telephone conference could be useful in resolving any of the outstanding issues, he is respectfully urged to contact Applicants' undersigned counsel at 202-408-4152.

If there is any fee due in connection with the filing of this Statement, please charge the fee to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

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By: 

Aaron M. Raphaël
Reg. No. 47,885